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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,069	10/01/2003	Martin Standing	IR-2257 (2-3684)	8099

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EXAMINER	
HA, NATHAN W	

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/677,069	STANDING, MARTIN	
	Examiner	Art Unit	
	Nathan W. Ha	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) *23-27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6-8 and 11-13, and 15-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Potter et al., US 5,426,263, previously cited.

In regard to claims 1 and 11, in fig.3, Potter discloses a semiconductor package comprising:

a first circuit board 30 including at least one conductive pad 34 disposed on a major surface thereof;

a second circuit board 32 including at least one conductive pad on a major surface thereof;

a semiconductor die 10 including a first electrical contact, or pad under the member, not shown, on a first major surface thereof and a second electrical contact 18 on a second major surface thereof, not shown;

a first layer of conductive adhesive 18 interposed between, and mechanically connected to the first contact and the at least one conductive pad on the board; and

a second layer of conductive adhesive, also 18, interposed between, and mechanically connected to the electrical contact and the at least one conductive pad 36

on the second circuit board; whereby the first electrical contact is electrically connected to said at least one conductive pad on said first circuit board and said second electrical contact is electrically connected to said at least one conductive pad on said second circuit board.

In regard to claims 2 and 12, Potter further discloses terminals 36 electrically connected to said first electrical contact and said second electrical contact of said semiconductor die, said terminals being disposed on at least one of said substrates.

In regard to claims 3 and 13, wherein each of said circuit board is an insulated metal substrate.

In regard to claim 4, wherein said semiconductor die is inherently a switching power semiconductor device which includes a control terminal, said control terminal being disposed on one of said first major surface of said die and said second major surface of said die and electrically connected to a conductive pad on one of said circuit boards, and electrically connected to a terminal disposed on one of said circuit boards.

In regard to claims 6-7, and 15-16, 20 wherein said first electrical contact and said second electrical contact of said semiconductor die are connected to respective conductive pads via respective layers of a conductive adhesive, solder bump. See fig.3, for example.

In regard to claim 8, Potter further discloses an epoxy underfilling 38 disposed between said circuit boards.

In regard to claims 17-18, wherein said power semiconductor devices are connected in a half-bridge configuration, see fig.5.

In regard to claim 19, a control device 40 for controlling the operation of said power semiconductor devices.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Potter as applied to claims 1-3 above.

In regard to claims 5 and 14, Potter discloses all claimed limitations as mentioned above except the semiconductor device one of a MOSFET and an IGBT.

It should be noted that transistors such MOSFET and IGBT are well known elements in the semiconductor packaging devices since these components construct IC circuits.

Therefore, it would have been obvious to one of ordinary skilled in the art to recognize that this cited package contains MOSFET transistors in order to construct an IC chip.

5. Claims 9-10 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Potter as applied to claims 1-8 and 11-20 above, and further in view of Kono, US 6,529,380.

In regard to claims 9-10 and 21-22, Potter discloses all of the claimed limitations as mentioned above except a heat sink that is placed on one of the substrates. It should be noted that heat sink is a must have in a semiconductor package to transfer heat to the outside. Otherwise, the package will be over heat. For example, Kono discloses a package with a substrate 5, chip 1, and a heat sink 6 in order to keep the chip working properly since device 6 prevents the chip from over heat.

Therefore, it would have been obvious to attach a heat sink to the package as taught by Kono in order to prevent the device from over heat.

Response to Arguments

6. Applicant's arguments filed 9/16/04 have been fully considered but they are not persuasive. For instance, Applicants contend that the cited art does not disclose a conductive adhesive to be interposed between the contacts of the die and the conductive pads of a circuit board or conductive substrate. This limitation is addressed in the above discussion. Element 18 is made of conductive material and attaches the substrate and the die together, element 18 functions as a conductive adhesive element (see also, col. 1, lines 53-56).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nathan Ha
November 22, 2004

Primary Howard Weiss
Patent Examiner